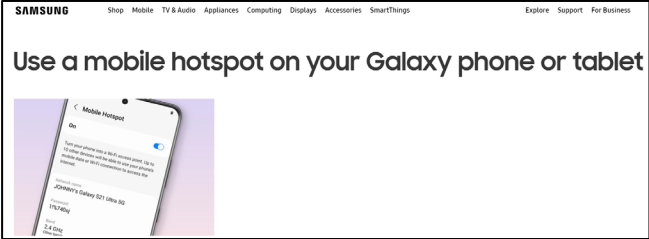


EXHIBIT 16

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

Claim 1	Accused Hotspot Devices ¹
<p>[1PRE] A wireless network device, comprising:</p>	<p>The Accused Hotspot Devices (such as Galaxy S20-S25 models, Galaxy Z Flip 3-6 models, Galaxy Z Fold 2-5 models, and Galaxy Note20 Ultra model smartphones) serve as a broadband wireless repeater when in a tethering mode.</p>  <p>See https://www.samsung.com/us/support/answer/ANS00079036/</p>
<p>[1A] a wireless transmitter that is configured for transmitting wireless data through electromagnetic signals that have a bandwidth greater than or equal to 100 MHz and less than or equal to 500 MHz at a data rate greater than or equal to 100 megabits per second and less than or equal to 480 megabits per second;</p>	<p>The Accused Hotspot Devices are configured to use both (a) WiFi 5/6/6E and (b) 5G cellular, which all have channels greater than 100 MHz and less than 500 MHz for communicating with a “ultrawideband wireless device.”</p> <p>According to the IEEE 802.11 standards, the Wi-Fi generations WiFi5, WiFi6, and WiFi6E, all provide 160 MHz channel widths.</p> <p>The Accused Hotspot Devices comprise a WiFi/Bluetooth combo chip that supports the transmission of wireless data with at least WiFi5(160 MHz) or WiFi6(160 MHz). According to the IEEE 802.11 standards, the Wi-Fi generations WiFi5 (802.11ac), WiFi6 (802.11ax-2019), and WiFi6E (802.11ax-2021), all provide 160 MHz channel widths.</p> <p>For example, IEEE 802.11ax (WiFi5) allows for data transmissions over a contiguous or non-contiguous 160 MHz. bandwidth. The 160 MHz. contiguous</p>

¹ Upon information and belief, all Accused Hotspot Devices function in a substantially similar manner for the relevant accused functionality.

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

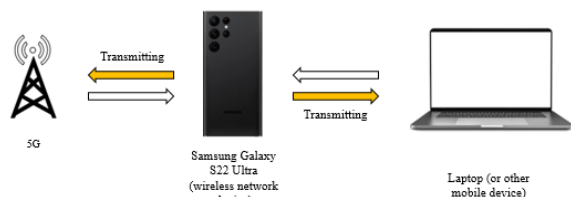
	<p>spectrum comprises 8 channels (20 MHz) that are bonded together. The 160 MHz. non-contiguous spectrum comprises two 4 channels (20 MHz) that are bonded together and concatenated to form 160 MHz. non-contiguous spectrum. The 160 MHz. bandwidth supports data rates of up to 6.93 Gbps, but does not indicate a minimum or lower bound for the data rate.</p> <p>The Accused Hotspot Devices comprise a mmWave antenna and tuner (e.g., transmitter or transceiver) to transmit wireless data over a 5G network. The Accused Hotspot Devices are compatible with at least one of the following cellular bands that fall at or between 100 MHz and 500 MHz:</p> <ul style="list-style-type: none"> • 5G bands: n41, n48, n78 • 5G mmWave bands: n257, n260, n261 <p>5G has various NR bands with bandwidths greater than 100 MHz and less than 500 MHz (n40, n41, n46, n48, n78, n90). Data rates for 5G can range from 10Mbps to 1,000Mbps. Data rates for 5G mmWave can reach data rates up to 10Gbps. Note actual 5G data rates are primarily dependent on telecommunication carriers.</p>  <p>The diagram illustrates a 5G network architecture. On the left, a 5G tower icon is labeled '5G'. A yellow arrow labeled 'Transmitting' points from the tower to a Samsung Galaxy S22 Ultra smartphone in the center, which is labeled 'Samsung Galaxy S22 Ultra (wireless network device)'. Another yellow arrow labeled 'Transmitting' points from the smartphone to a laptop on the right, which is labeled 'Laptop (or other mobile device)'.</p>
<p>[1B] a wireless receiver that is configured for receiving wireless data through electromagnetic signals that have a bandwidth greater than or equal to 100 MHz and less than or equal to 500 MHz at a data rate greater than or equal to 100 megabits per second and less than or equal to 480 megabits per second;</p>	<p>The Accused Hotspot Devices comprise a 5G modem, 5G transceiver, and a Wi-Fi/BT combo chip, configured to receive wireless data according to the 5G standard and WiFi6 (802.11ax).</p> <p>For example, the image below shows a Galaxy S22 Ultra circuit board comprising a Broadcom Wi-Fi 6/6E chip. See www.techinsights.com/blog/samsung-galaxy-s22-ultra-teardown</p>

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

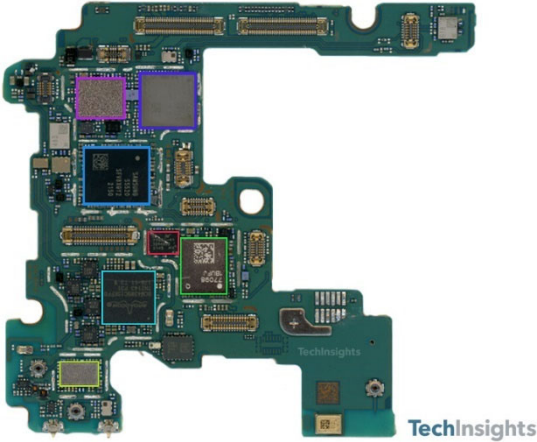
	
<p>[1C] wherein the wireless transmitter is configured for transmitting wireless data that contains information present in or determined from wireless data that has been received by the wireless receiver,</p>	<p>The Accused Hotspot Devices are configured to:</p> <ol style="list-style-type: none">1. receives wireless data through the 5G communication protocol and transmits the received data over the WiFi6 (802.11ax) communication protocol.2. receives wireless data through the WiFi6 (802.11ax) communication protocol and transmits the received data over the 5G communication protocol.3. receives wireless data through the 5G communication protocol and transmits information determined from the wireless data over the 5G.4. receives wireless data through the WiFi6 (802.11ax) communication protocol and transmits information determined from the wireless data over the WiFi6 (802.11ax).

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

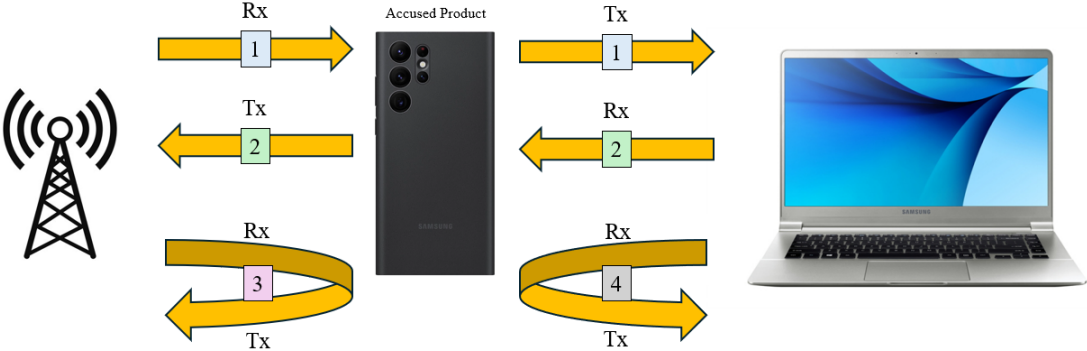
	 <p>The diagram illustrates the Accused Product (a Samsung Galaxy S20 Ultra) connected to two wireless networks. On the left, the 5G Mobile Network is represented by a tower icon. Three communication paths are shown: Path 1 (Rx) is a straight arrow from the tower to the phone; Path 2 (Tx) is a straight arrow from the phone to the tower; Path 3 (Rx and Tx) is a loop between the tower and the phone. On the right, the WiFi Network is represented by a laptop icon. Two communication paths are shown: Path 1 (Tx) is a straight arrow from the phone to the laptop; Path 2 (Rx) is a loop between the phone and the laptop. Path 4 (Rx and Tx) is also shown as a loop between the phone and the laptop.</p>
<p>[1D] wherein the wireless network device is configured for processing wireless data received by the wireless receiver, and</p>	<p>The Accused Hotspot Devices comprise a controller that is configurable for processing wireless data in both a Wi-Fi network (e.g., WiFi5, WiFi6, or WiFi6E) and a cellular network (e.g., 4G LTE or 5G), which are wireless networks.</p> <p>For example, the Galaxy S20 Ultra comprises, among other things, a STMicroelectronics STM32G071EB 32-bit ARM microcontroller and a Qualcomm SDX55M 5G modem. www.ifixit.com/Teardown/Samsung+Galaxy+S20+Ultra+Teardown/131607?srsId=AfmBOorbKmG1FgZYkgqQsKc3mMYaHd6vA_c9nDDoDhWlkT_IkjlHRT-t</p> <p>In another example, the Galaxy S22 Ultra comprises, among other things, a Samsung RF Transceiver S5520, a Broadcom Front-End Module AFEM-9140, a Skyworks Front-End Module SKY58083-11, a Broadcom Wi-Fi 6/6E&BT 5.0 SoC BCM4389, and a Qorvo Front-End Module QM77098. www.techinsights.com/blog/samsung-galaxy-s22-ultra-teardown</p> <p>Wi-Fi protocols, such a Wi-Fi5, WiFi6 and WiFi6E, use IP and/or MAC addresses to identify connected devices. See e.g., www.techtarget.com/searchnetworking/answer/What-is-the-difference-between-an-IP-address-and-a-physical-address/.</p> <p>The Accused Hotspot Devices utilize WPA2 and/or WPA3 protocols to allow for secure broadcasting of a WiFi hotspot, which employs a handshake sequence that</p>

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

	<p>requires data processing via network information of devices requesting to join the mobile hotspot.</p> <p>https://insights.samsung.com/2022/12/16/how-to-turn-your-galaxy-smartphone-into-a-hotspot-3/</p> <p>https://en.wikipedia.org/wiki/Wi-Fi_Protected_Access</p> <p>The cellular modem in the Accused Hotspot Devices also configures the Accused Hotspot Devices for operation in a cellular network (e.g., 4G LTE or 5G).</p>
[1E] wherein the wireless network device is configured for determining whether any, a portion, or all information in the processed wireless data should be transmitted by the wireless transmitter.	<p>The Accused Hotspot Devices include a controller that can determine whether to transmit wireless data based on configured network settings.</p> <p>For example, the Accused Hotspot Devices can be configured to display a list of the mobile user devices connected to the Wi-Fi network provided by the mobile hotspot. See e.g., devices.vodafone.com.au/samsung/galaxy-s21-5g-android-11-0/connectivity/use-your-phone-as-wi-fi-hotspot/</p> <p>In another example, the controller can be configured for specific network settings (e.g., whitelist, blacklist, firewall settings) o to filter out wireless data transmissions (e.g., signals or data communication) based on blocked (blacklisted) MAC addresses or source IP addresses.</p> <p>The “processed wireless data” refers to the wireless data received by the wireless receiver in element [1D]. It is the essence of, and an inherent operation of, a tethering device to transmit to the tethered device some or all of the information that it receives.</p>
Claim 11	Accused Hotspot Devices
[11] The wireless network device of claim 1 wherein the wireless network device comprises two or more antennas.	<p>The Accused Hotspot devices include at least two antennas.</p> <p>For example, the images below show that the Samsung Galaxy S21 comprising at least two mmWave 5G antenna and a Wi-Fi antenna. See https://www.ifixit.com/Guide/Samsung+Galaxy+S21+5G+Antenna+Replacement/148692</p>

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999



EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

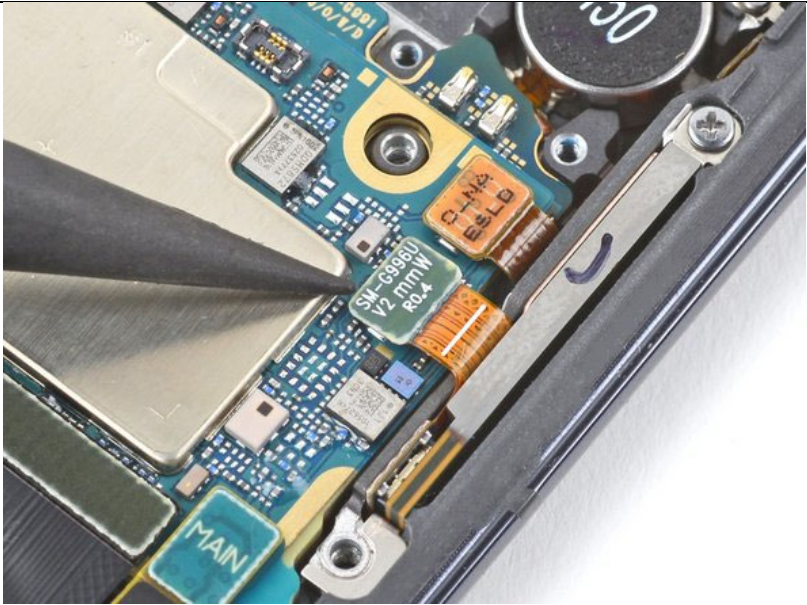
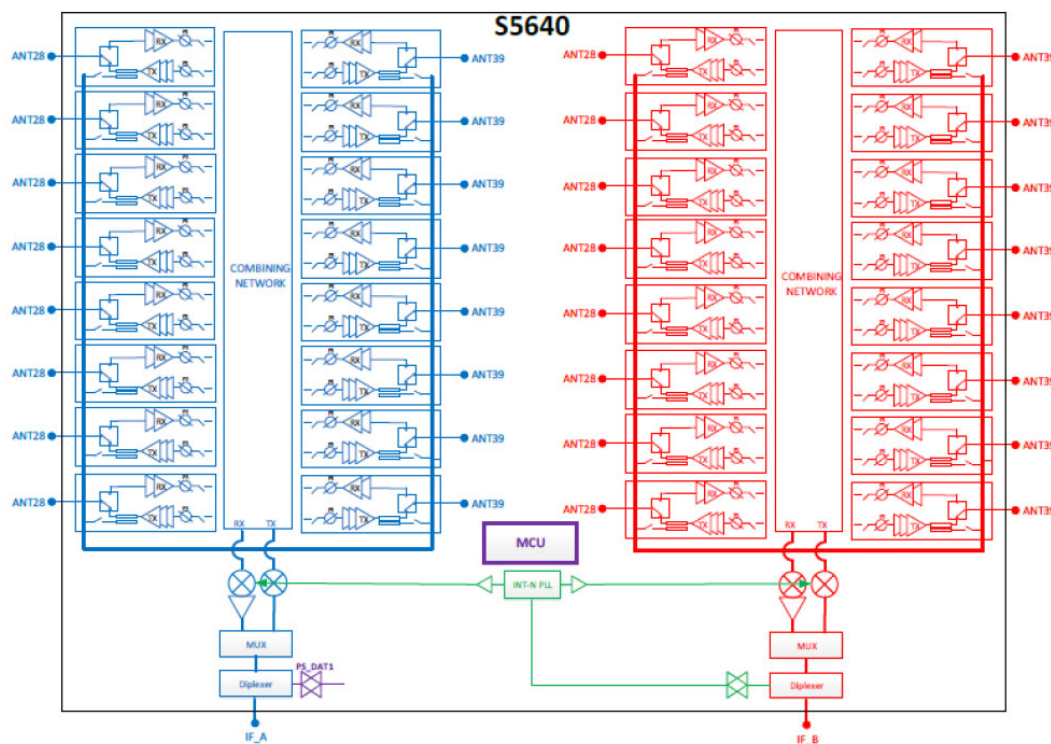
	
Claim 12	Accused Hotspot Devices
<p>[12] The wireless network device of claim 11 wherein the wireless network device is configured for using MIMO antenna technology.</p>	<p>The Accused Hotspot Devices utilize the Qualcomm Snapdragon processor mobile platforms (specific chipset varies by accused product) are configured to employ MIMO in 5G and WiFi contexts.</p> <p><i>See</i> product sheet for the Qualcomm Snapdragon processor used in Galaxy S22 Ultra: https://www.qualcomm.com/content/dam/qcomm-martech/dm-assets/documents/snapdragon-8-gen-1-mobile-platform-product-brief.pdf</p>
Claim 15	Accused Hotspot Devices
<p>[15A] The wireless network device of claim 1 wherein the wireless network device comprises a steerable antenna; and</p>	<p>The Accused Hotspot Devices comprise at least one steerable antenna.</p> <p>The at least one steerable antenna includes an antenna array that consists of multiple individual antenna elements arranged in a specific geometric pattern. Each element</p>

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

radiates a signal, and the combination of these signals forms the overall radiation pattern of the array. Beam steering is achieved by controlling the phase of the signals fed to each individual antenna element in the array.

According to an Operational Description for an Accused mmWave Product, the Accused mmWave Product includes a “mmW Antenna Module,” which includes “two separate phased array chips (S5640).” Each phase array chip includes 20 antenna ports: 10 for 28 GHz band and 10 for 39 GHz band.



See fccid.io/A3LSMA536V/Operational-Description/A3LSMA536V-Operational-Description-Main-Part-R4-5651659.pdf (“Operational Description”).

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

	<p>A teardown of a Galaxy S20 Ultra describes that this Accused mmWave Product includes “two Qualcomm RF ICs ... w/multilayer package substrate antenna array ...” <i>See</i> electronics360.globalspec.com/article/15093/teardown-samsung-galaxy-s20-ultra-5g</p> <p>The “Criticality of 5G Modem to RF Integration; A look inside Samsung Galaxy S20 Ultra” article (https://omdia.tech.informa.com/om006104/criticality-of-5g-modem-to-rf-integration-a-look-inside-samsung-galaxy-s20-ultra) describes a teardown of the S20 Ultra, including that the Qualcomm RF ICs in the Galaxy S20 Ultra are QTM525 mmWave Antenna modules.</p> <p>The Qualcomm article “5G Modems, RF and Antennas — Getting mmWave Data into the Device” describes the QTM525 mmWave antenna module as including an “array of tiny mmWave antenna elements ...” <i>See</i> www.qualcomm.com/developer/blog/2019/11/5g-modems-rf-and-antennas-getting-mmwave-data-device</p> <p>The Qualcomm article further describes the QTM525 mmWave antenna module, in communication with the 5G modems (e.g., Snapdragon X50, X55, X60), as capable of beamforming and beam tracking to avoid obstructions.</p> <p>mmWave technology works well in cities, where you can locate a small cell on top of a building and serve an entire block. In a dense, urban environment, the buildings would normally be an obstruction. But beamforming and beam tracking take advantage of them as an endless series of surfaces off of which the mmWaves can bounce.</p> <p>On the device, multiple mmWave antenna modules like the QTM052 and QTM525 are located in different places, as shown in the image below. The baseband modem switches among the antenna modules, depending on the source of the strongest signal. All of that takes place in real time in fractions of a millisecond.</p> <p><u>See <i>Id.</i></u></p>
--	--

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

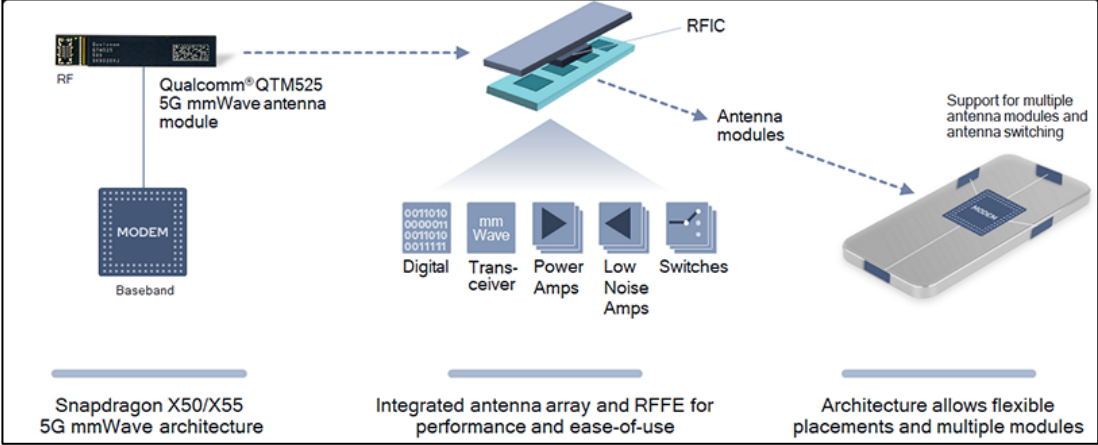
	 <p>See <i>Id.</i></p>
<p>[15B] wherein the wireless transmitter is configured for using the steerable antenna for transmitting wireless data through electromagnetic signals that have a bandwidth greater than or equal to 100 MHz and less than or equal to 500 MHz.</p>	<p>The at least one steerable antenna in the Accused Hotspot Devices is configured to operate with a 5G modem on a 5G network, which provides a channel bandwidth that fall at or between 100 MHz and 500 MHz.</p> <p>See claim elements [1A] and [15B] above.</p>
<p>Claim 26</p>	<p>Accused Hotspot Devices</p>
<p>[26] The wireless network device of claim 1 wherein the wireless network device is configured to operate in a cellular network.</p>	<p>See claim elements [1A]-[1D] above.</p>
<p>Claim 31</p>	<p>Accused Hotspot Devices</p>
<p>[31PRE] A wireless networking method, comprising:</p>	<p>See claim elements [1PRE] above.</p>

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

[31A] transmitting wireless data through electromagnetic signals that have a bandwidth greater than or equal to 100 MHz and less than or equal to 500 MHz at a data rate greater than or equal to 100 megabits per second and less than or equal to 480 megabits per second with a wireless transmitter that is part of or in communication with a wireless network device;	See claim elements [1A] above.
[31B] receiving wireless data through electromagnetic signals that have a bandwidth greater than or equal to 100 MHz and less than or equal to 500 MHz at a data rate greater than or equal to 100 megabits per second and less than or equal to 480 megabits per second with a wireless receiver that is part of or in communication with the wireless network device;	See claim elements [1B] above.
[31C] processing wireless data received by the wireless receiver with a processor that is part of or in communication with the wireless network device; and	See claim elements [1D] above.
[31D] determining whether any, a portion, or all information in the processed wireless data should be transmitted by the wireless transmitter,	<p>The “processed wireless data” refers to the wireless data received by the wireless receiver in element [31C]. It is the essence of, and an inherent operation of, a tethering device to transmit to the tethered device some or all of the information that it receives.</p> <p>See claim elements [1E] above.</p>

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

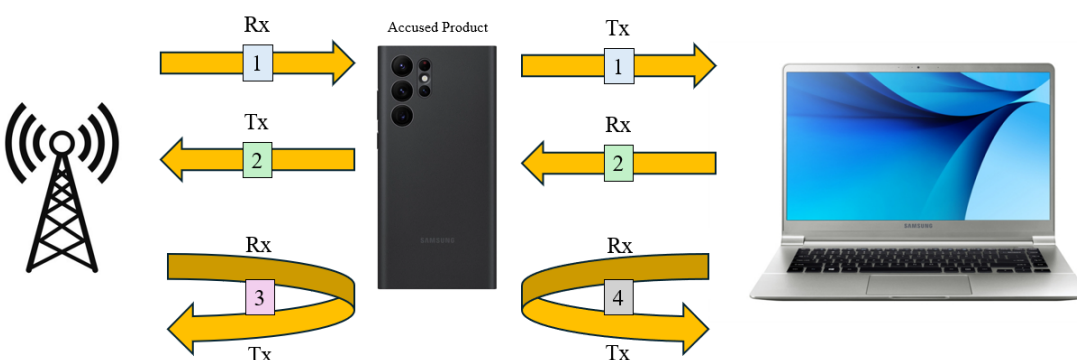
<p>[31E] wherein the wireless data transmitted in the transmitting step contains information present in or determined from wireless data that was received by the wireless receiver in the receiving step.</p>	<p>The Accused Hotspot Devices are configured to:</p> <ol style="list-style-type: none"> 5. receives wireless data through the 5G communication protocol and transmits the received data over the WiFi6 (802.11ax) communication protocol. 6. receives wireless data through the WiFi6 (802.11ax) communication protocol and transmits the received data over the 5G communication protocol. 7. receives wireless data through the 5G communication protocol and transmits information determined from the wireless data over the 5G. 8. receives wireless data through the WiFi6 (802.11ax) communication protocol and transmits information determined from the wireless data over the WiFi6 (802.11ax). <p>5G Mobile Network</p> <p>WiFi Network</p> 
Claim 32	Accused Hotspot Devices
<p>[32PRE] A wireless network device, comprising:</p>	<p>See claim element [1PRE] above.</p>
<p>[32A] a wireless transmitter that is capable of transmitting wireless data through electromagnetic signals that have a</p>	<p>The Accused Hotspot Devices are all configured to use both (a) WiFi 5/6/6E and (b) 5G cellular, which all have channels greater than 100 MHz and less than 500 MHz for communicating with a “ultrawideband wireless device.”</p>

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

<p>bandwidth greater than or equal to 100 MHz and less than or equal to 500 MHz;</p>	<p>See claim element [1A] above.</p> <p>WiFi5, WiFi6 and WiFi6E all have 160 MHz channels.</p> <div data-bbox="850 318 1701 621"> </div> <p>Accused Product</p> <p>5G has various NR bands with bandwidths greater than 100 MHz and less than 500 MHz (n40, n41, n46, n48, n78, n90)</p> <div data-bbox="858 774 1568 1105"> </div> <p>Accused Product</p>
<p>[32B] a wireless receiver that is capable of receiving wireless data through electromagnetic signals that have a bandwidth greater than or equal to 100 MHz and less than or equal to 500 MHz;</p>	<p>The Accused Hotspot Devices are all configured to use both (a) WiFi 5/6/6E and (b) 5G cellular, which all have channels greater than 100 MHz and less than 500 MHz for communicating with a “ultrawideband wireless device.”</p> <p>See claim element [1A] above.</p>

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999


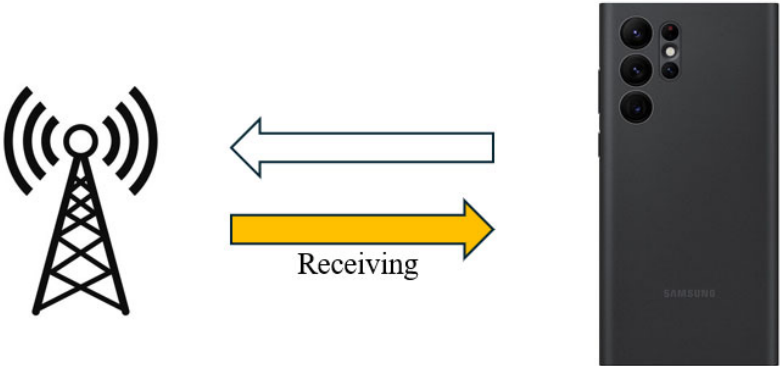
	<p>WiFi5, WiFi6 and WiFi6E all have 160 MHz channels.</p>  <p>Accused Product</p> <p>5G has various NR bands with bandwidths greater than 100 MHz and less than 500 MHz (n40, n41, n46, n48, n78, n90)</p>  <p>Accused Product</p>
[32C] wherein the wireless transmitter is configured for transmitting wireless data that contains information present in or	See claim element [1A] above.

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

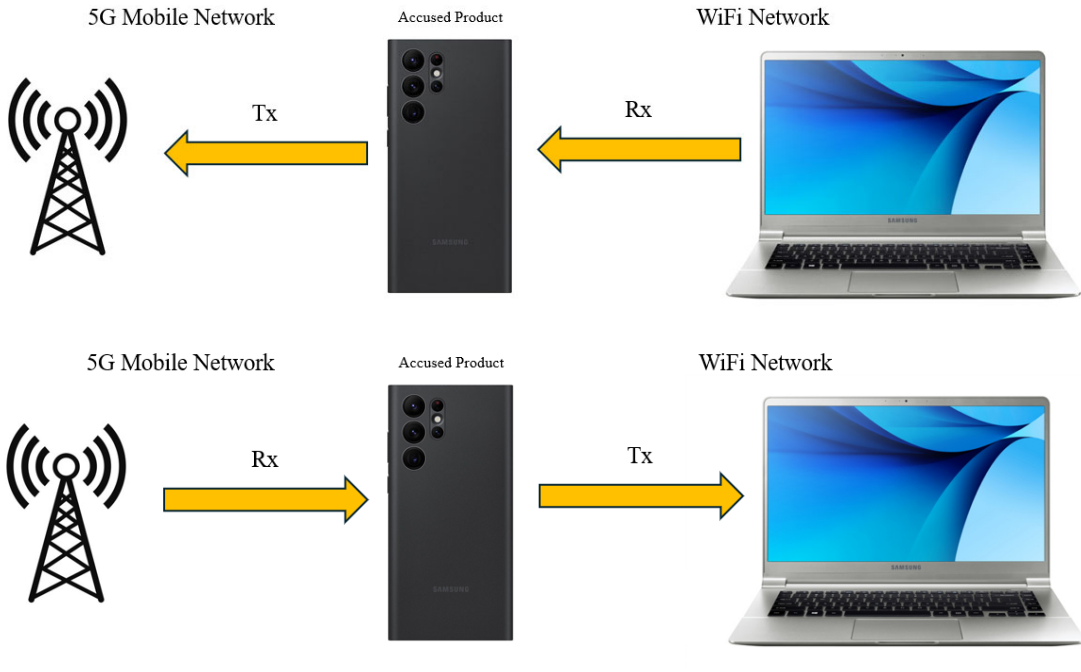
<p>determined from wireless data that has been received by the wireless receiver,</p>	 <p>The diagram illustrates two data flow scenarios involving a 5G Mobile Network, an Accused Product (a Samsung smartphone), and a WiFi Network (represented by a laptop). Top scenario: A yellow arrow labeled 'Tx' points from the Accused Product to the 5G Mobile Network (represented by a radio tower icon). Another yellow arrow labeled 'Rx' points from the WiFi Network to the Accused Product. Bottom scenario: A yellow arrow labeled 'Rx' points from the 5G Mobile Network to the Accused Product. Another yellow arrow labeled 'Tx' points from the Accused Product to the WiFi Network.</p>
<p>[32D] wherein the wireless network device is configured for processing wireless data received by the wireless receiver,</p>	<p>See claim element [1D] above.</p>
<p>[32E] wherein the wireless network device is configured for determining whether any, a portion, or all information in the processed wireless data should be transmitted by the wireless transmitter, and</p>	<p>The “processed wireless data” refers to the wireless data received by the wireless receiver in element [32D]. It is the essence of, and an inherent operation of, a tethering device to transmit to the tethered device some or all of the information that it receives. See claim elements [1E] above.</p>
<p>[32F] wherein the wireless network device is configured for transmitting beacon frames with the wireless transmitter.</p>	<p>The Accused Hotspot Devices transmit beacon frames via both cellular (4G and 5G) and WiFi.</p>

EXHIBIT 16 – CLAIM CHART FOR U.S. PATENT 10,224,999

	<p>Logical channels in 4G and 5G transmit beacon frames to broadcast information about the network. The logical channels with beacon frames include one or more of:</p> <ul style="list-style-type: none">• Broadcast Control Channel (BCCH)• Paging Control Channel (PCCH)• Common Control Channel (CCH)• Dedicated Control Channel (DCCH)• Dedicated Traffic Channel (DTCH) <p>See https://www.electronics-notes.com/articles/connectivity/5g-mobile-wireless-cellular/data-channels-physical-transport-logical.php.</p> <p>Beacon frames are management frames in IEEE 802.11. See https://en.wikipedia.org/wiki/Beacon_frame.</p>
--	---